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The Commonwealth of Massachusetts
Executive Office of Health and Human Services
Department of Mental Health

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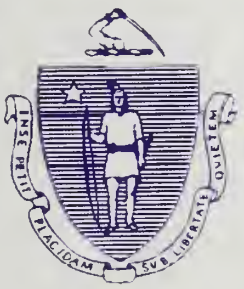
Mortality Report
1998-1999



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COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF MENTAL HEALTH

1998-1999 MORTALITY REPORT

INTRODUCTION

Research has repeatedly documented that people with serious mental illness are at increased risk of dying prematurely in a range from 1.6 to 2.8 times greater than the general population (1-10, 26). Countries as varied as Canada, Denmark, Germany, Israel, Norway, Spain, Taiwan and the United Kingdom have each individually documented this disturbing finding. And, although, predictably, psychiatric patients have been found to be at particular risk from suicide, they also are at increased risk of dying from medical conditions such as cardiovascular, infectious and respiratory illnesses.

The relationship between mental disorders and physiologic changes is not clearly understood. Some studies have suggested that mental disorders or accompanying stress may lead to physiologic changes which then alter endocrine and immunologic function, thereby resulting in decreased resistance (11). People with serious mental illness also are more likely to live in poverty, to smoke, to have concurrent medical i... ...and never to have married. A number of studies from various countries have shown that lack of emotional support and social networks can increase the risk of death from medical conditions, such as myocardial infarction, as much as eight-fold, even after adjusting for factors such as smoking (12-16). Lower socioeconomic status also has been shown to be associated with a higher death rate, even adjusting for factors such as smoking (17-18). Finally, tobacco use contributes significantly to years of life lost, and people with serious

mental illness are more likely to smoke than the general population (19-20). This may be related to the antidepressant and antipsychotic effect of nicotine, which has been suggested in several studies.

People with serious mental illness in the United States have similarly been shown to be at increased risk for premature death from accidents, infectious, cardiovascular and circulatory illnesses, and suicide (21-25). Therefore, it is incumbent upon the Commonwealth of Massachusetts to examine this possible trend among its own citizens with serious mental illness in order to develop appropriate plans to address health and wellness issues in this high risk population.

OVERVIEW

A primary mission of the Department of Mental Health (DMH) is to serve people with serious mental illness. DMH served 27,733 people (adults, children and adolescents) in 1998 and 32,289 people in 1999. As can be seen in Table 1, 133 DMH clients died from a variety of causes in 1998 and 164 DMH clients died in 1999. [1] In 1998, the age-adjusted mortality for DMH clients was 411.8 deaths per 100,000 people, lower than the age-adjusted mortality for Massachusetts (433.1) or for the United States (471.7).[2] Because of changes made by the World

[1] In July 1996, DMH implemented a uniform eligibility determination process for individuals in need of DMH services. Anyone who went through the process and met the DMH-established clinical criteria was deemed "eligible." The database used to calculate the number of DMH clients served includes individuals who received case management and/or inpatient and/or residential services during the three-year period plus individuals who were deemed eligible for DMH services but may not have received any of the aforementioned three services during that time. It does not include children who received certain short-term services or adults who received certain other community-based DMH services (e.g. clubhouse) that do not require formal eligibility determination. During 1997, DMH implemented a uniform protocol for reporting "critical incidents," including deaths, of individuals receiving specified DMH services.

[2] Mortality rates are customarily calculated per 100,000 population for standardization purposes and are adjusted for differences in age distribution among populations, using National Vital Statistics methodology, to permit comparisons among similarly standardized populations.

TABLE 1

Age-Adjusted Mortality:*

	1998	1999
DMH Deaths	133	164
DMH Population	27,733	32,289
DMH CRUDE Death Rate	479.6 per 100,000	507.9 per 100,000
MASS Crude Death rate	886.4	877.5
DMH Age-Adjusted Mortality	411.8 per 100,000	577.9 per 100,000[1]
MASS Age-Adjusted Mortality	433.1 per 100,000	815.9
US Age-Adjusted Mortality	471.7	Not Available

***Notes**

1. **The age-adjusted rate is the summary rate that is used so that any differences in rates cannot be attributed to age differences among populations. Two important elements of the summary age-adjusted rate in a statewide population are infant mortality and the deaths of individuals over age 75. Since there no infants and few clients over age 75 in DMH, the utility of the age-adjusted rate may be somewhat limited in understanding deaths in DMH.**
2. **1998 and 1999 age-adjusted mortality may not be compared across the years, either for DMH or Massachusetts, because changes were made in 1999 by the World Health Organization to the Coding System and to the way of calculating the standard population. Therefore, 1998 DMH data may be compared to 1998 Massachusetts data; and 1999 DMH data to 1999 Massachusetts data.**

Health Organization in 1999 in the way age-adjusted mortality is calculated, the 1999 figures cannot be compared to 1998 or other data from previous years, making it difficult to make comparisons of summary data over time. In 1999, the age-adjusted mortality for DMH clients was 577.9 per 100,000, lower again than the age-adjusted mortality for the Massachusetts population (815.9). (See Appendix A)

For DMH clients, the largest number of deaths occurred in the 35 to 64 year age group in both years, in marked contrast to Massachusetts as a whole, where the largest number of deaths occurred among individuals aged 85 and older. This is partly because the DMH population is comprised mostly of 25 to 54 year olds and includes very few individuals over 85, as compared to the rest of the Commonwealth.

As can be seen in Table 2, in both 1998 and 1999, the age-specific death rate for

TABLE 2

Age Specific Death Rates, per 100,000:

1998

Age Group	**15-24**	**25-44**	**45-64**
DMH	68.3	388.8	809.4
MASS	47.2	116.3	587.2

1998

Age Group	**15-24**	**25-34**	**35-44**	**45-54**	**55-64**
DMH	68.3	236.9	479.2	655.1	1119.1
US	54.5	109.6	199.6	423.5	1030.7

1999

Age Group	**15-24**	**25-44**	**45-64**
DMH	135.5	394.7	892.5
MASS	46.0	118.4	565.4

DMH clients between the ages of 15 and 64 is substantially higher than the age-specific death rates for Massachusetts or the United States. These individuals with mental illness from 15 to 64 years of age, in both years, have a death rate that is 1.4 to 3.3 times higher than the general population. While the most pronounced difference is in the 25 to 44 year old group, a substantial increase in premature death also can be seen in the 45 to 54 year old and 15 to 24 year old age groups.

LEADING CAUSES OF DEATH

Natural causes accounted for 72.7% of all DMH client deaths. As noted in Table 3, for 1998, the leading causes of death for DMH clients were: cardiac disease (33.1% of deaths); injuries, including accidents, suicide and homicide (16.5%); cancer (15.0%); pulmonary disease (8.3%); and pneumonia (4.5%). In 1999, the leading causes of death for DMH clients were: cardiac disease (32.9% of all deaths); injuries, including accidents; suicide and homicide (14.6%); pulmonary disease (12.2%); cancer (10.4%); and pneumonia (4.3%). By comparison, in the

TABLE 3

Leading Causes of Death as Percentage of all Deaths:

1998	***MASS***	***DMH***
	1) Cardiac Disease 29%	1) Cardiac Disease 33.1%
	2) Cancer 25%	2) Injuries (including accidents, suicide, homicide) 16.5%
	3) Stroke 6%	3) Cancer 15.0%
	4) Pulmonary Disease 5%	4) Pulmonary Disease 8.3%
	5) Pneumonia/Influenza 5%	5) Pneumonia 4.5%
	6) Injuries 4%	
1999	***MASS***	***DMH***
	1) Cardiac Disease 27.9%	1) Cardiac Disease 32.9%
	2) Cancer 24.8%	2) Injuries (including accidents, suicide, homicide) 14.6%
	3) Stroke 6.4%	3) Pulmonary Disease 12.2%
	4) Pulmonary Disease 5.1%	4) Cancer 10.4%
	5) Injuries 4.2%	5) Pneumonia 4.3%
	6) Pneumonia/Influenza 3.9%	

same years, the Department of Public Health (DPH) reported that the leading causes of death in the Commonwealth as a whole were: heart disease (28.5% of

all deaths); cancer (24.9%); stroke (6.3%); pulmonary disease (5%); injury (4.2%); and pneumonia/influenza (3.9%).

While heart disease is the leading cause of death both for DMH clients and in the Commonwealth, and pulmonary disease is ranked third (1999) or fourth (1998) in both DMH and the Commonwealth, there are differences in the percent of total deaths caused by these two diseases. Heart disease and pulmonary disease account for a greater proportion of the deaths among individuals with mental illness than in Massachusetts as a whole. Since the population within DMH is a much younger population than in the Commonwealth as a whole, it is noteworthy to find such an excess of deaths from these two medical conditions, deaths which are usually more typical in older people.

Injuries, including suicide, also are more prominent as a cause of death among DMH clients, due largely to the greater suicide rate among individuals with mental illness as compared to the general population. Suicide is discussed in greater detail below.

In the two years studied, there also are a number of similarities between DMH clients and the general population; for example, deaths from pneumonia/influenza account for approximately the same proportion of deaths in both. On the other hand, cancer deaths, as a percent of all deaths among DMH clients, are only half what they are for the population at large. The proportion of deaths from stroke also are substantially lower among DMH clients as compared to the general population; 1% of DMH deaths, as compared to 6.2% for Massachusetts.

Given the younger age distribution among DMH clients compared to the general Massachusetts population, it is more informative to examine the age-adjusted and age-specific death rates for certain leading causes of death than to compare percents of all deaths for the same diseases. The age-adjusted rate of death from cardiac disease for all DMH clients was 142.2 per 100,000 for 1998 as compared to the Massachusetts age-adjusted death rate of 110.2 per 100,000 for the same disease in the same period, a modest increase. For 1999, the age-adjusted rate for DMH clients was 206.5 deaths per 100,000 as compared to the Massachusetts age-adjusted rate of 223.8 (See Appendix B).

However, further examination of cardiac deaths in certain age groups, the age-specific mortality, reveals striking differences between individuals with mental illness and the general population, as can be seen in Tables 4 and 5. Especially noteworthy is the six to seven-fold increase in the number of deaths from cardiac events among DMH clients in the 25 to 44 year old group in 1998 and 1999. There is a substantial two-fold increase in cardiac deaths in the 45 to 64 year age-range as well. The deaths in these age groups are masked by the age-adjusted mortality figures because DMH has fewer than expected cardiac deaths in the youngest and oldest groups and relatively small numbers of clients in those groups.

Another feature of the DMH cardiac death data is the male to female ratio, which is 1.2 males for every one female in 1998 and 1.4 to 1 in 1999. The comparable male/female ratios for Massachusetts are 1.9 to 1 for 1998 and 1.6 to 1 for 1999.

The usual male preponderance of cardiac deaths is less apparent for DMH. clients. The nearly equal male to female ratio among DMH clients dying of heart

TABLE 4

Leading Causes of Death by Age Groupings, 1998: (expressed as deaths/100,000)

Age 15-24	*MASS*	*DMH*
Motor Vehicle[1]	14.1	see accident
Suicide	7.5	45.6
Homicide	5.3	0
Injuries of undetermined intent[1]	4.7	see accident
Accident[1]		22.8
Age 25-44		
Cancer	21.8	26.5
Injuries	15.9	17.7 (Accidents)
Heart Disease	14.7	97.2
Suicide	10.7	79.5
Chronic Liver Disease	not listed <10.7	26.5
Pulmonary Disease	not listed	26.5[2]
Age 45-64		
Cancer	236.6	159.2
Heart Disease	141.4	252.1
Diabetes	19.1	not available[3]
Chronic Liver Disease	18.8	13.3
Pulmonary Disease	not listed <18.8	119.4[4]

Notes

1. **DMH coding system lists accidents, but does not distinguish between motor vehicle accidents and accidents of undetermined intent. Presumably, the DMH rate encompasses both categories and might be compared to a sum of the Massachusetts Motor Vehicle and Injuries of Undetermined Intent. There was one accident reported in 1998 as a cause of death among DMH youths, 15-24.**
2. **Including one apnea, one respiratory arrest.**
3. **The National Center for Vital Statistics uses a number of computer-based programs to determine cause of death when multiple conditions are listed. DMH may be coding death from diabetes under other conditions.**
4. **Including two respiratory arrests.**

disease raises a question that deserves further study - that is, whether female DMH clients have an even higher than expected rate of heart disease than their male counterparts.

TABLE 5

Leading Causes of Death by Age Groupings, 1999: (expressed as deaths per 100,000)

Age 15-24	*MASS*	*DMH*
Motor Vehicle[1]	12.1	
Suicide	5.1	77.44[2]
Injuries, undetermined intent[1]	5.0	
Homicide	4.5	0
Accident[1]		22.8
Age 25-44		
Cancer	22.8	24.2
Heart Disease	15.8	104.7
Injuries[1]	13.7	16.1 (accidents)
Suicide	9.3	8.06
Chronic Pulmonary Disease	not listed in DPH summary <9.3	64.4
Age 45-64		
Cancer	224.5	119.72
Heart Disease	130.0	337.4
Liver Disease	18.9	32.65
Chronic Pulmonary Disease	18.7	32.65 (or counting 5 respiratory arrest deaths, 87.1)

Notes

1. **DMH coding system does not distinguish between motor vehicle and other injuries. One DMH client, age 15-24, and two clients, age 25-44, died in an "accident", giving rates of 22.8 and 16.1, but it is not clear how this compares to Massachusetts data, given the small number and the difference in definition.**
2. **The DMH 1999 suicide rate for 15-24 year olds is higher than in 1998, and represents an increase of two suicide deaths in this age group. The DMH 1998 suicide rate for 25-44 year olds is higher than 1999, and represents an increase of eight suicide deaths in this age group. There were 16 deaths from suicide in 1998; 15 in 1999. The crude rate among DMH clients for suicide was 57.7 per 100,000 in 1998 and 46.4 per 100,000 in 1999.**

Pulmonary disease also figures more prominently among DMH clients as a leading cause of death in the 25 to 64 year age group, both in 1998 and 1999, with a two to six-fold increase in deaths related to pulmonary disease in DMH as compared to the general population. Liver disease, including cirrhosis and liver failure, also

may account for a greater number of deaths among 25 to 64 year old DMH clients, although the data involve small numbers and vary by age group and year.

Examination of the age-specific cancer death rates for 25 to 64 year old DMH clients suggests that for this group, for 1998 and 1999, the death rate is equal to or lower than the death rate from cancer for other citizens of the Commonwealth. The age-adjusted death rate for all DMH clients for cancer was 63.6 people per 100,000 in 1998, and 51.44 in 1999, as compared to the age-adjusted rates for Massachusetts of 129.5 in 1998 and 179.25 in 1999 (Appendix C).

SUICIDE

Individuals with serious mental illness have a higher rate of death from suicide than individuals in the general population. There were 16 deaths from suicide in 1998 and 15 in 1999 among DMH clients. Overall, the suicide rate among DMH clients was 57.7 per 100,000 in 1998, declining to 46.4 in 1999. This paralleled the decline in statewide rates, which decreased from 7.3 to 6.7 during the same years. Although the male/female ratio for suicide in the general population was three and one-half to four times higher for males, the ratio of males to females was 1.1 to 1 in the DMH population. Paradoxically, although the rate of suicide was higher among DMH clients than for the general population, one notable finding is the relative equality of rates between males and females.

As can be seen in Tables 4 and 5, the age-specific rates vary dramatically from year to year, because of relatively small changes in the number of suicides in a particular age category, even while the total numbers are declining. Suicide was a

leading cause of death in 15 to 44 year olds, among DMH clients and in the general population, but it was six to seven times more prevalent among DMH clients in these age groups than in the Commonwealth as a whole. The differential in suicide rates between DMH clients and the population at large is not unexpected, given the mission of DMH. Given the significant prevalence of individuals with depression and other serious mental illnesses among those served by DMH, it would be unlikely for suicide rates to be the same. Moreover, the number of suicides in the general population is most likely under-reported, due to stigma and reluctance by physicians and medical examiners to assign suicide as a cause of death. Suicide is a major concern for DMH, as it is for the Department of Public Health. Recent, high level attention to suicide as a preventable death also has been given by David Satcher, MD, United States Surgeon General. DMH will continue to monitor this issue, with attention paid to differences in the number of suicides, depending on type, duration or alteration of interventions, as well as demographic factors, diagnosis and medications.

SUMMARY

Overall, individuals with serious mental illness who receive services from the Department of Mental Health do not have a higher crude death rate or age-adjusted death rate than the population of the entire state. The age-specific death rate for individuals between the ages of 15 and 64 is however 1.4 to 3.3 times higher for DMH clients than for the general Massachusetts population.

The leading causes of death for DMH clients and for the Commonwealth's citizens are, for the most part, similar, with heart disease, cancer, injuries, pulmonary

disease and pneumonia/influenza among the top six causes of death in both populations. However, heart disease, pulmonary disease and suicide account for a greater proportion of all deaths among DMH clients than in Massachusetts as a whole, while cancer and stroke account for a lower percentage of all deaths in DMH than for the population at large.

One of the most striking findings has been that the age-specific mortality for cardiac events in the 25 to 54 year age group is as much as six to seven times higher among DMH clients than for the general population. Pulmonary disease is also two to six times more problematic as a cause of death for DMH clients in the 25 to 64 year age group, than for similar age individuals in the general population.

PLAN OF ACTION

Improving the Quality of Information for Individuals, Providers and Policy Makers

Through its "Changing Minds" campaign, DMH will raise awareness about health promotion and prevention among providers and consumers of mental health services and primary care by developing, "Best Practices for Prevention of Medical Illness for People with Serious Mental Illness." This document will contain a comprehensive review of all medical risk factors for people with serious mental illness, based on available data, attend to the causes of death noted in this report, and include a set of guidelines that summarizes and organizes evidence-based interventions for the targeted population. For instance, cardiovascular disease risk can be broken down to smoking, hypertension, diabetes, insufficient exercise and obesity. Each of these elements of heart risk will be summarized in terms of the evidence-based interventions described in the scientific literature. Clinical tips for

physicians and case managers will be updated, and strategies for consumers to align their choices with minimizing risk will be included.

This report contains the best mortality information concerning DMH clients that has ever been available. As a result of methodological improvements, mortality data from the years 1998 and 1999 could be analyzed so that variations in mortality by disease category, age and gender became apparent for the first time. However, these data should be taken as suggestive, not as conclusive, for certain technical reasons. It is difficult to compare rates for certain causes of death when DMH and DPH define them differently. As another example, the small number of deaths for each cause makes small variations in numbers lead to large variations in rate. For example, a rate can go from 77.4 per 100,000 one year to 45.6 the following year, a seemingly dramatic drop, when the difference represents two individuals.

- DMH will continue to improve its methodologies for data collection. This will enable the Department to understand whether the current results are valid or whether they represent limitations in the methodology. Factoring in a number of potentially confounding factors, such as race, marital status or poverty, may explain the higher age and disease-specific death rates in the DMH population, rather than some factor specific to having a serious mental illness. The Department also expects that coding and recording of death certificates will be aligned with the World Health Organization, the National Vital Statistics System and the Massachusetts Department of Public Health. Only by using identical methodologies can truly reliable comparisons be made between DMH data and data from the general Massachusetts population or from other states. The Department also will improve its categorization of deaths by conforming to the International Classification of Diseases, 10th Revision (ICD-10), which is

utilized by vital statistic agencies nationwide. These technical changes will enable future reports to have even more reliable data. The availability of improved analytic tools and more reliable information on DMH client deaths is essential for the Department to target remedial efforts appropriately and to monitor the effects of those efforts over time.

- A collaborative study with the Division of Medical Assistance (DMA) on the role of antipsychotic medication usage in persons with serious mental illness is currently underway. Preliminary data suggest that costs for medical care are higher for individuals taking specific medications. We need to further examine this phenomenon with DMA to discern whether this higher utilization is related to functional improvement, to reliance on emergency rather than primary care, to increased development of medical conditions related to psychiatric illness, or to the treatments for psychiatric illnesses.
- The Department's Mental Health Information System (MHIS), currently under development, will include a large number of potential risk factors, for example, weight, smoking history, cholesterol and medical history. Linking information about these risk factors with long-term outcomes will permit DMH to identify those factors that contribute both to morbidity and mortality in our population. This information will be useful in identifying specific subgroups of DMH clients who may benefit from targeted prevention and intervention strategies.
- DMH's Office of Investigations investigates allegations of illegal, dangerous or inhumane events that affect DMH clients, as well as all medico-legal deaths. The Office investigated 120 reported client deaths in 1998 and 1999. Although only a portion of all deaths were subject to full investigation and may not be fully representative, a closer look at the investigation reports of DMH clients

ages 25-55, who died unexpectedly of natural causes, may provide clues to factors contributing to the apparent early mortality of these individuals.

Regardless of whether or not future data analyses suggest that DMH clients have more cardiovascular disease than matched counterparts in the general population, DMH will increase awareness and activities to improve the cardiovascular health of its clients. A great deal of cardiovascular risk can be modified by everyday choices people make. For instance, smoking, diet and exercise are three behaviors that greatly impact cardiovascular risk.

- Smoking is known to be the major preventable risk factor in the development of both pulmonary and cardiovascular disease. DPH reports that the prevalence of smoking in Massachusetts is 18.9%, but informal estimates suggest that the prevalence may be as high as 70% among DMH clients, making smoking a major public health issue in people with serious mental illness. The DPH and the Massachusetts Tobacco Control Program have demonstrated the success of smoking cessation programs that combine counseling with psychopharmacologic treatments. In collaboration with DPH, DMH will train a group of its clinicians as tobacco treatment specialists, distribute the DPH/UMass Medical School Tobacco Treatment Training for Physicians and other Health Providers, and encourage utilization of existing DPH counseling resources in order to promote smoking reduction and cessation in our population. The Department also is piloting interventions, e.g. the nicotine patch plus counseling, and the nicotine patch plus bupropion plus counseling, for individuals receiving outpatient services who desire to quit smoking. Although pharmacologic nicotine reduction treatments have been key in

smoking reduction programs, only bupropion, and not the nicotine patch, is currently available through most health plans.

Health Screening/Integration of Medical Care

Early screening and preventive intervention for common medical problems, such as hypertension, diabetes, elevated LDL cholesterol and triglycerides, also can reduce cardiovascular risk. There is some evidence that people with serious mental illness are at risk for all of these medical problems.

- In collaboration with DMA, DMH has been engaged in improving communication among DMH clients, mental health providers and medical providers. This approach includes screening for common medical problems, medication flow sheets and medical treatment plans, is about to be introduced statewide. DMH case managers will update the medical information form yearly, include medical issues in each client's Individual Service Plan, and encourage clients to seek regular medical care.
- As a result of the collaboration between DMH and DMA, one of DMA's Primary Care Plans has initiated a pilot, whereby health care professionals are placed directly at a DMH community site, markedly improving utilization of health care options among DMH clients at that site.
- In addition to cardiovascular risk, DMH has initiated Hepatitis C screening for all patients in its facilities. Hepatitis C is a common, serious and chronic infection that may lead to cirrhosis, liver failure, liver cancer and early death. Preliminary information suggests the possibility of a higher rate of Hepatitis C among patients hospitalized in DMH facilities than for the general population. DMH, in collaboration with DPH, is increasing professional training regarding Hepatitis C and developing patient education programs focussed on prevention

of disease and liver failure. Treatment for Hepatitis C has been only partially successful and is associated with a high number of toxic side effects, especially among individuals with a history of depression and mental illness. For these reasons, development of a treatment protocol for DMH clients will require careful selection and support of appropriate individuals, monitoring for worsening of psychiatric conditions, psychiatric consultation for medical care providers and increased monitoring of psychotropic medications which are metabolized primarily in the liver.

- DMH participates in the Massachusetts Patient Safety Leadership Forum sponsored by the Massachusetts Medical Society and is working towards integrating the principles described in the Institute of Medicine's recently released report, Crossing the Quality Chasm, into the operation of its facilities. DMH shares the belief that care should be customized to an individual's needs and values, with the patient as the source of control, with coordination of care based on the best available knowledge, cooperation among clinicians and the enhancement of patient safety.

Suicide

Most recent studies on suicide suggest that psychiatric illness, particularly depression, is a significant factor in a majority of suicides. Recognition of this fact is critical to developing public policies for suicide prevention in the country as a whole. For individuals already in treatment, however, there are other predictor variables that need to be evaluated, in specific cases, such as co-occurring substance use disorder, previous suicide attempt, family history of suicide, and access to lethal weapons.

- DMH is currently conducting post-mortem reviews on 97 DMH clients who committed suicide between 1996 and 2000. This database includes factors such as diagnosis, living situation, relationship difficulties, and changes in care, physical illness and substance abuse.
- DMH, through the Commonwealth Research Center, is participating in a worldwide study of clozapine and suicide reduction.
- The Surgeon General released his suicide prevention plan on May 3, 2001. The recommendations include the elimination of barriers in insurance programs for provision of high quality mental health programs, a step that has already been taken in Massachusetts. The Surgeon General's plan also calls for better training for mental health and human service professionals concerning suicide risk assessment, treatment and long-term management. DMH applauds the Surgeon General's recognition of suicide as a major public health problem and is implementing training initiatives for DMH providers in recognizing and responding to enhanced suicide risk among DMH clients, including the distribution to providers of Clinical Guidelines on Suicide Assessment and Prevention.

Research

Through it's two research Centers of Excellence, DMH funds a research base that enables investigators to seek additional funding on areas of importance to the Department. Examples of research that are germane to this issue are:

- Studying lowered levels of estrogen in women with schizophrenia. Estrogen is known to be protective for cardiovascular disease.

- Assessing the role of life style interventions for people who have gained weight while taking antipsychotic medications.
- Participating in an international study related to the prevention of suicidality in patients on certain antipsychotic medications.
- Assessing the role of different medication therapies and clinical interventions in preventing substance abuse disorders, which are thought to be a profound risk factor for early death.

CONCLUSION

This DMH Mortality Report marks a significant advance in the quality of information available regarding client mortality. Detailed analysis suggests that individuals with serious mental illness may be at greater risk of morbidity and mortality at younger ages from cardiac, pulmonary and hepatic disease than the population at large. Improvements in the quality of information gathered by DMH will permit the Department to determine the validity of these results, provide detailed information on risk factors and make possible the development of targeted remedial strategies. The Department also is engaged in a number of prevention activities, including client education, adult vaccination and smoking cessation. Through cooperation with other state agencies, DMH seeks to improve its clients' access to high quality medical care and to integrate information about health status into mental health service planning. Through its Office of Investigations and participation in the Massachusetts Medical Society's Patient Safety Initiatives, DMH is working to protect patient safety, for example, in efforts to reduce medication errors and the risk of suicide.

DMH is on the forefront nationally in developing rigorous, data-driven analyses of the medical and psychiatric needs of its clients. One important tool in assessing the healthcare needs of any population is the study of deaths in that population. By tracking and understanding deaths DMH can develop more effective strategies for promoting the health and quality of life for its clients.

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APPENDICES

APPENDIX A

DMH 1998 Age-Adjusted Mortality:

Age Group (in years)	DMH Deaths	DMH Population	1940 Standard	DMH Age-Adjusted Mortality
0-14	0	3,140	0.250416	0.00
15-24	3	4,389	0.181677	12.42
25-34	10	4,221	0.162066	38.39
35-44	34	7,095	0.139237	66.72
45-54	33	5,034	0.117811	77.23
55-64	28	2,502	0.080294	89.86
65-74	18	991	0.048426	87.96
75-84	5	303	0.017393	28.55
>85	2	52	0.002770	10.65
Total	**133**	**27,727**[1]	**1.0**	**411.80**

DMH 1999 Age-Adjusted Mortality:

Age Group	DMH Deaths	DMH Population	2000 Standard	DMH Age-Adjusted Mortality
0-14	0	3,859	0.214700	0.00
15-24	7	5,165	0.138646	18.80
25-34	3	4,531	0.135573	8.97
35-44	46	7,883	0.162613	94.89
45-54	38	6,116	0.134834	83.77
55-64	44	3,072	0.087247	124.96
65-74	14	1,199	0.066037	77.11
75-85	9	385	0.044842	104.82
>85	3	72	0.015508	64.62
Total	**164**	**32,282**[1]	**1.0**	**577.94**

Notes

1. **The dates of birth for six clients in 1998 and seven clients in 1999 were not recorded. These individuals are not included in the DMH population totals.**

APPENDIX B

1998 DMH Age-Adjusted Death Rate From Cardiac Disease:

Age Group (in years)	Cardiac Deaths	DMH Population	1940 Standard	Age-Adjusted Mortality
0-14	0	3,140	0.250416	0.0
15-24	0	4,389	0.181677	0.0
25-34	1	4,221	0.162066	3.8
35-44	10	7,095	0.139237	19.6
45-54	9	5,034	0.117811	21.1
55-64	10	2,502	0.080294	32.1
65-74	10	991	0.048426	48.9
75-85	2	303	0.017393	11.5
>85	1	52	0.002770	5.3
Total	**43**	**27,727**	**1.0**	**142.2**

1999 Age-Adjusted Death Rate From Cardiac Disease:

Age Group (in years)	Cardiac Deaths	DMH Population	2000 Standard	Age-Adjusted Mortality
0-14	0	3,859	0.214700	0.0
15-24	0	5,165	0.138646	0.0
25-34	1	4,531	0.135573	3.0
35-44	12	7,883	0.162613	24.8
45-54	15	6,116	0.134834	33.1
55-64	16	3,072	0.087247	45.4
65-74	4	1,199	0.066037	22.0
75-85	3	385	0.044842	34.9
>85	2	72	0.015508	43.1
Total	**53**	**32,282**	**1.0**	**206.3**

APPENDIX C

1998 DMH Age-Adjusted Death Rate From Cancer:

Age Group (in years)	Cancer Deaths	DMH Population	1940 Standard	Age-Adjusted Mortality
0-14	0	3,140	0.250416	0.0
15-24	0	4,389	0.181677	0.0
25-34	0	4,221	0.162066	0.0
35-44	3	7,095	0.139237	5.9
45-54	6	5,034	0.117811	14.0
55-64	6	2,502	0.080294	19.2
65-74	5	991	0.048426	24.4
75-85	0	303	0.017393	0.0
>85	0	52	0.002770	0.0
Total	**20**	**27,727**	**1.0**	**63.6**

1999 Age-Adjusted Death Rate From Cancer Disease:

Age Group (in years)	Cancer Deaths	DMH Population	2000 Standard	Age-Adjusted Mortality
0-14	0	3,859	0.214700	0.0
15-24	0	5,165	0.138646	0.0
25-34	0	4,531	0.135573	0 .0
35-44	3	7,883	0.162613	6.2
45-54	4	6,116	0.134834	8.8
55-64	7	3,072	0.087247	19.9
65-74	3	1,199	0.066037	16.5
75-85	0	385	0.044842	0.0
>85	0	72	0.015508	0.0
Total	**17**	**32,282**	**1.0**	**51.4**